

REMARKS/ARGUMENTS

1. § 103 Rejections

The Examiner has rejected claims 1, 2, 6, 7, 8, 9/1, 9/8, 12, and 13 under 35 U.S.C. § 103 as being unpatentable for obviousness over Danner (1,674,856) in view of Anderson (6,196,026).

The Examiner asserts that Danner teaches a method of producing sheets of glass wherein;

1. The sheet of glass has two faces, face (F1) and face (F2) wherein one side of said sheet (F1) presents a "hardened skin surface which will prevent it becoming marred". A stream of glass (1a) delivered which has a first face (s2) and a second face (s1), and each face is free from making contact with any surface as evidenced in the region of the s1 and s2 lead lines.
2. Further, while the glass is in contact with the "treatment device or mechanism (4a)" the second face (s1) of the glass sheet (1a) is cooled by an air blast nozzle. Since the inverse relationship between glass temperature and viscosity is well established and the "treatment device or mechanism (4a)" cooperates in the cooling of the glass sheet", said device increases the viscosity of the glass sheet. The "treatment device or mechanism (4a)" is therefore understood to both accompany "the falling of said glass while increasing glass viscosity" as claimed.
3. A device or mechanism for controlling glass travel speed (7,8) acts upon the treated stream (1a') (pg 3, Lines 7-8).
4. The glass sheet is thereafter conveyed into a leer of annealing chamber which is understood to effect the "cooling of said sheet of glass" as claimed (pg 2, line 55).

The present invention is directed at a fusion draw method for low viscosity glasses. In a fusion draw process, the stream of fused melted glass falls down through the air without making contact with any surface, in order to form glass sheets having a high surface quality that is not achievable via other processes without subsequent polishing steps. As the glass stream falls through the air and cools, it is acted upon to further control its speed, width and thickness. Typically the glass stream is further drawn while still soft, without touching the surface of the glass in a central region of the stream, in order to further thin and/or widen the stream glass before it hardens into a sheet of glass. When attempting fusion draw glass sheets having a low viscosity, the unsupported falling low viscosity glass tends to become unstable. The present invention solves this problem by temporarily supporting the low viscosity stream of glass, in order to raise its viscosity. It is submitted that neither Danner or Anderson disclose such a low viscosity glass fusion draw process as is claimed in claim 1 as presently amended.

Claim 1 as presently amended, claims:

“A method of producing sheets of glass having two faces (F1, F2) with at least one of said faces (F1) presenting a high surface quality in a fusion down draw process, the method comprising:

a) delivering a stream of glass (1a) having a viscosity in the range of about 10 Pa.s to about 1000 Pa.s (100 poises to 10,000 poises), said stream of glass (1a) falling downward and having a first and second face (s1, s2), each face is free from making contact with any surface and thus possibly being destabilized mechanically;

b) treating said delivered stream of glass (1a) prior to destabilization by putting a first face (s2) into contact with a surface of a treatment device or mechanism (4a) suitable, temporarily, to support the weight of said glass and for accompanying the falling movement of said glass while increasing glass viscosity and maintaining at least a central strip of said second face (s1) free from any contact with any surface;

c) releasing said treated stream of glass (1a') from said treatment device or mechanism (4a), said treated stream of glass falling (1a') downward from said treatment device or mechanism with at least said second face (s1) being free from making contact with any surface;

d) using a device or mechanism (7, 8) for controlling [glass travel] the speed, width and thickness of the treated stream of glass (1a) to act on the treated stream (1a') at a suitable distance downstream of the treatment device or mechanism; and

e) cooling said treated and acted on stream of glass to produce a sheet of glass.

The Applicant respectfully submits that Danner and Anderson do not teach or suggest a “fusion down draw process” in which the “treated stream of glass fall[s] (1a') downward from said treatment device or mechanism with at least [the] second face (s1) being free from making contact with any surface” and further acts on the treated stream of glass “using a device or mechanism for controlling the speed, width and thickness of the treated stream of glass” as recited claim 1 as presently amended.

As pointed out by the Examiner, the second face of the stream of glass in the Danner device is cooled and hardened by an air blast nozzle. (See Danner. Page 2, lines 82-90, “The air-blast against the soft sheet not only serves to effectually press the sheet against the roll....., but also tends to quickly cool the outer side of the sheet and give it a glazed formation so that it will not be marred by coming in contact with a deflecting agent...”). It is submitted that a stream of glass having one surface thereof “glazed” or “hardened” as taught by Danner cannot be further acted on “using a device or mechanism (7, 8) for controlling the speed, width and thickness of the treated stream of glass” as currently claimed. In fact, such a hardening prevents one from further acting on the glass in this manner. As such, Danner teaches away from the invention as claimed in claim 1 as presently amended.

Anderson likewise does not teach or suggest a fusion draw process as recited in claim as presently amended. Even if one could argue that Anderson does teach or suggest a fusion draw process, Anderson also fails to teach a "fusion down draw process" in which the "treated stream of glass fall[s] (1a') downward from said treatment device or mechanism with at least [the] second face (s1) being free from making contact with any surface" and further acts on the treated stream of glass "using a device or mechanism for controlling the speed, width and thickness of the treated stream of glass" as recited claim 1 as presently amended. It would also be improper to combine Anderson with Danner to arrive at the presently claimed invention, as Danner teaches away from presently claimed step d) by hardening one surface of the glass during the treatment step b).

In view of the above, the Applicant respectfully submits that claim 1 as currently amended is not rendered obvious by Danner as combined with Anderson, and requests that the Examiner withdraw the rejection of claim 1, and depending claims 2, 6, 7, 8, 9/1, 9/8, 12, and 13, under 35 U.S.C. § 103 as being unpatentable for obviousness over Danner in view of Anderson. Furthermore, since all of the remaining claims depend from claim 1 as amended, and claim 1 is patentable over the art of record, the Applicant requests that the Examiner also withdraw the rejections of all of the other claims remaining in the application.

Based upon the above amendments, remarks, and papers of records, applicant believes the pending claims of the above-captioned application are in allowable form and patentable over the prior art of record. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Applicant believes that no extension of time is necessary to make this Reply timely. Should applicant be in error, applicant respectfully requests that the Office grant such time extension pursuant to 37 C.F.R. § 1.136(a) as necessary to make this Reply timely, and hereby authorizes the Office to charge any necessary fee or surcharge with respect to said time extension to the deposit account of the undersigned firm of attorneys, Deposit Account 03-3325.

Please direct any questions or comments to Bruce P Watson at 607-974-3378.

Respectfully submitted,



Bruce P Watson
Attorney for Assignee
Registration Number: 35,405
Corning Incorporated
SP-TI-03-1
Corning, NY 14831
Phone: 607-974-3378

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